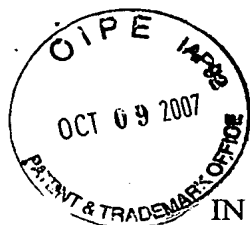


10/828,663.

Cafe



PATENT
135830

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent No.: 7,254,937 B2

Issued: August 14, 2007

Inventor(s): Hull et al.

Assignee: General Electric Company

For: GAS TURBINE HEAT EXCHANGER
ASSEMBLY AND METHOD FOR
FABRICATING SAME

Certificate
of Correction
OCT 11 2007

CERTIFICATE OF MAILING

I certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on October 5, 2007.

Robert B. Rueser, III
Reg. No. 45,548

Attention Certificate of Corrections Branch
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REQUEST FOR CERTIFICATE OF CORRECTION OF
PATENT UNDER 37 C.F.R. 1.322(a)

Sir:

Attached is Form PTO/SB/44 suitable for printing.

Submitted herewith is a copy of the Notice of Allowance and Fee(s) Due and the Notice of Allowability dated March 20, 2007, a copy of the Request for Continued Examination filed on March 2, 2007, and a copy of the Amendment filed January 31, 2007. Applicants respectfully submit that the corrections shown below are in accordance with the Amendment filed January 31, 2007. The corrections thereof do not involve such changes in the patent as would constitute new matter or would require re-examination. Applicants respectfully request a Certificate of Correction for the following:

In Claim 1, column 7, line 9, delete "air to a said" and insert therefor -- air to said --.

OCT 11 2007

PATENT
135830

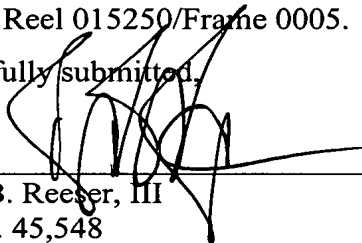
The correction is not due to any error by Applicants and no fee is due.

The Assignment for this patent is recorded on Reel 015250/Frame 0005.

Date: _____

Oct 5, 2007

Respectfully submitted,



Robert B. Reeser, III
Reg. No. 45,548
ARMSTRONG TEASDALE LLP
One Metropolitan Square, Suite 2600
St. Louis, Missouri 63102-2740
(314) 621-5070

OCT 11 2007

**UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION**

PATENT NO. : 7,254,937 B2
APPLICATION NO. : 10/828,663
ISSUE DATE : August 14, 2007
INVENTOR(S) : Hull et al.

PAGE 1 OF 1

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In Claim 1, column 7, line 9, delete "air to a said" and insert therefor -- air to said --.

MAILING ADDRESS OF SENDER:

Robert B. Reeser, III
Armstrong Teasdale LLP
One Metropolitan Sq., Suite 2600
St. Louis, MO 63102

1007 11 2007

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

7590 03/20/2007
John S. Beulick
Armstrong Teasdale LLP
Suite 2600
One Metropolitan Square
St. Louis, MO 63102

| | |
|-------------------------|--------------|
| EXAMINER | |
| KIM, TAE JUN | |
| ART UNIT | PAPER NUMBER |
| 3746 | |
| DATE MAILED: 03/20/2007 | |

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/828,663 | 04/21/2004 | Peter R. Hull | 135830 | 4932 |

TITLE OF INVENTION: GAS TURBINE HEAT EXCHANGER ASSEMBLY AND METHOD FOR FABRICATING SAME

| APPLN. TYPE | SMALL ENTITY | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE |
|----------------|--------------|---------------|---------------------|----------------------|------------------|------------|
| nonprovisional | NO | \$1400 | \$300 | \$0 | \$1700 | 06/20/2007 |

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

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Page 1 of 3
PTOL-85 (Rev. 07/06) Approved for use through 04/30/2010
By: em

SCANNED
By: 3/27/07

ENTERED
Date: 3/26/07
By: ma
12729-323

OCT 11 2007



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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/828,663 | 04/21/2004 | Peter R. Hull | 135830 | 4932 |

7590 03/20/2007

John S. Beulick
Armstrong Teasdale LLP
Suite 2600
One Metropolitan Square
St. Louis, MO 63102

EXAMINER

KIM, TAE JUN

| | |
|----------|--------------|
| ART UNIT | PAPER NUMBER |
|----------|--------------|

3746

DATE MAILED: 03/20/2007

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 93 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 93 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

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Notice of Allowability

Application No.

10/828,663

Examiner

Ted Kim

Applicant(s)

HULL ET AL.

Art Unit

3746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 03/02/2007.
2. ☒ The allowed claim(s) is/are 8-21.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

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Application/Control Number: 10/828,663
Art Unit: 3746

Page 2

EXAMINER'S AMENDMENT

1. Claim 8 is directed to an allowable generic claim. Because all claims previously withdrawn from consideration under 37 CFR 1.142 have been rejoined, **the restriction requirement as set forth in the Office action mailed on 09/30/2005 is hereby withdrawn.** In view of the withdrawal of the restriction requirement as to the rejoined inventions, applicant(s) are advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application. Once the restriction requirement is withdrawn, the provisions of 35 U.S.C. 121 are no longer applicable. See *In re Ziegler*, 443 F.2d 1211, 1215, 170 USPQ 129, 131-32 (CCPA 1971). See also MPEP § 804.01.
2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee:

Authorization for this examiner's amendment was given in a telephone interview with Robert Reeser III on 3/14/2004.

The application has been amended as follows:

Claims

OCT 11 2007

Application/Control Number: 10/828,663
Art Unit: 3746

Page 3

- Claim 8, line 6, after “outlet manifold” –adjoining each other and – has been inserted.
- Claim 17, line 9, after “outlet manifold” –adjoining each other and – has been inserted.

REASONS FOR ALLOWANCE

3. The following is an examiner’s statement of reasons for allowance: the prior art of record do not fairly teach in permissible combination the claimed invention. In particular, it is noted that the arguments filed 01/31/2007 in view of the claims, as further amended above, are persuasive and binding.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

Contact Information

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Ted Kim whose telephone number is 571-272-4829. The Examiner can be reached on regular business hours before 5:00 pm, Monday to Thursday and every other Friday.

The fax number for the organization where this application is assigned is 571-273-8300.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Ehud Gartenberg, can be reached at 571-272-4828. Alternate inquiries to Technology Center 3700 can be made via 571-272-3700.

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Application/Control Number: 10/828,663
Art Unit: 3746

Page 4

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). General inquiries can also be directed to the Patents Assistance Center whose telephone number is 800-786-9199. Furthermore, a variety of online resources are available at <http://www.uspto.gov/main/patents.htm>



Ted Kim

Primary Examiner

March 19, 2007

Technology Center 3700

Telephone 571-272-4829

Fax (Regular) 571-273-8300

Fax (After Final) 571-273-8300

Telephone 571-272-3700

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| | | | |
|-----------------------------------|---------------------------------------|---|-------------|
| Notice of References Cited | Application/Control No. 10/828,663 | Applicant(s)/Patent Under Reexamination HULL ET AL. | |
| | Examiner Ted Kim | Art Unit 3746 | Page 1 of 1 |

U.S. PATENT DOCUMENTS

| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Name | Classification |
|---|---|--|-----------------|---------------|----------------|
| * | A | US-3,701,381 A | 10-1972 | Watts, Hargus | 165/82 |
| | B | US- | | | |
| | C | US- | | | |
| | D | US- | | | |
| | E | US- | | | |
| | F | US- | | | |
| | G | US- | | | |
| | H | US- | | | |
| | I | US- | | | |
| | J | US- | | | |
| | K | US- | | | |
| | L | US- | | | |
| | M | US- | | | |

FOREIGN PATENT DOCUMENTS

| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Country | Name | Classification |
|---|---|--|-----------------|---------|------|----------------|
| | N | | | | | |
| | O | | | | | |
| | P | | | | | |
| | Q | | | | | |
| | R | | | | | |
| | S | | | | | |
| | T | | | | | |

NON-PATENT DOCUMENTS

| * | | Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) |
|---|---|---|
| | U | |
| | V | |
| | W | |
| | X | |

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

OCT 11 2007

Acknowledgement Receipt

The USPTO has received your submission at **15:32:21** Eastern Time on **02-MAR-2007** by Deposit Account: 012384.

\$ **790** fee paid by e-Filer via *RAM* with Confirmation Number: 214.

eFiled Application Information

| | |
|---|--|
| EFS ID | 1560591 |
| Application Number | 10828663 |
| Confirmation Number | 4932 |
| Title | Gas turbine heat exchanger assembly and method for fabricating same |
| First Named Inventor | Peter R. Hull |
| Customer Number or Correspondence Address | John S. Beulick Armstrong Teasdale LLP Suite 2600 One Metropolitan Square St. Louis MO 63102 US 3146215070 |
| Filed By | Robert B. Reeser/Tracey Paterson |
| Attorney Docket Number | 135830 |
| Filing Date | 21-APR-2004 |
| Receipt Date | 02-MAR-2007 |
| Application Type | Utility |

Entered into PAGE/PIPS

Date: 3-7-07

By: tlp

Application Details

| Submitted Files | Page Count | Document Description | File Size | Warnings |
|------------------------|------------|---|--------------|----------|
| 135830RCE02MAR2007.pdf | 3 | Request for Continued Examination (RCE) | 641676 bytes | ◆ PASS |
| fee-info.pdf | 2 | Fee Worksheet (PTO-06) | 8181 bytes | ◆ PASS |

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing

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Receipt, in due course.

If you need help:

- *Call the Patent Electronic Business Center at (866) 217-9197 (toll free) or e-mail EBC@uspto.gov for specific questions about Patent e-Filing.*
- *Send general questions about USPTO programs to the USPTO Contact Center (UCC) .*
- *If you experience technical difficulties or problems with this application, please report them via e-mail to Electronic Business Support or call 1 800-786-9199.*

OCT 11 2007

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| Electronic Patent Application Fee Transmittal | | | | |
|---|----------|---|--------|----------------------|
| Application Number: | | 10828663 | | |
| Filing Date: | | 21-Apr-2004 | | |
| Title of Invention: | | Gas turbine heat exchanger assembly and method for fabricating same | | |
| First Named Inventor/Applicant Name: | | Peter R. Hull | | |
| Filer: | | Robert B. Reeser/Tracey Paterson | | |
| Attorney Docket Number: | | 135830 | | |
| Filed as Large Entity | | | | |
| Utility Filing Fees | | | | |
| Description | Fee Code | Quantity | Amount | Sub-Total in USD(\$) |
| Basic Filing: | | | | |
| Pages: | | | | |
| Claims: | | | | |
| Miscellaneous-Filing: | | | | |
| Petition: | | | | |
| Patent-Appeals-and-Interference: | | | | |
| Post-Allowance-and-Post-Issuance: | | | | |
| Extension-of-Time: | | | | |

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| Description | Fee Code | Quantity | Amount | Sub-Total in USD(\$) |
|-----------------------------------|----------|----------|--------|----------------------|
| Miscellaneous: | | | | |
| Request for continued examination | 1801 | 1 | 790 | 790 |
| Total in USD (\$) | | | | 790 |

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PTO/SB/30EFS (08/06)

Approved for use through 08/31/2006. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL (Submitted Only via EFS-Web)

| | | | | | | | |
|----------------------|---------------|-------------|------------|-------------------------------|--------------|-----------|------|
| Application Number | 10828663 | Filing Date | 2004-04-21 | Docket Number (if applicable) | 135830 | Art. Unit | 3746 |
| First Named Inventor | Peter R. Hull | | | Examiner Name | Kim, Tae Jun | | |

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☒ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

☒ Other Amendment After Final filed on January 31, 2007

☐ Enclosed

☐ Amendment/Reply

☐ Information Disclosure Statement (IDS)

☐ Affidavit(s)/ Declaration(s)

☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☒ The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to
Deposit Account No 012384

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

OCT 11 2007

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PTO/SB/30EFS (08/06)

Approved for use through 08/31/2006. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

| Signature of Registered U.S. Patent Practitioner | | | |
|--|-------------------------|---------------------|------------|
| Signature | /Robert B. Reeser, III/ | Date (YYYY-MM-DD) | 2007-03-02 |
| Name | Robert B. Reeser, III | Registration Number | 45548 |

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

CCT 11 2007

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

COPY

THE UNITED STATES PATENT OFFICE IS REQUESTED TO IMPRESS ITS STAMP
ON THIS CARD AND PLACE SAME IN THE OUTGOING MAIL TO SHOW THE
FOLLOWING PAPERS HAVE BEEN RECEIVED.

Atty Dkt. No.: 135830 (12729-373)

Inventors: Peter R. Hull et al.

Serial No.: 10/828,663

Filed: April 21, 2004

For: GAS TURBINE HEAT EXCHANGER ASSEMBLY AND METHOD FOR
FABRICATING SAME

Enclosed:

1. Amendment Transmittal (3 pages), in duplicate
2. Amendment in response to the Office Action dated December 6, 2006, and
made final (16 pages)
3. Return receipt postcard

RBR/MJAL/gdm

Mailed: January 31, 2007

Express Mail No.: EV 918278911 US

EV918278911US

Entered into PAGE/PIPS

Date 02-09-07

By: em

SCANNED

By: 2/7/07 gm

55 787

Express Mail No.: EV 918278911 US

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PATENT
Attorney Docket No.: 135830

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Peter R. Hull et al.

Serial No.: 10/828,663

Filed: April 21, 2004

For: GAS TURBINE HEAT
EXCHANGER ASSEMBLY
AND METHOD FOR
FABRICATING SAME

Group No.: 3746

Examiner: Kim, Tae Jun

Mail Stop: AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL

1. Transmitted herewith is:
Amendment Transmittal (3 pgs.), in duplicate
Amendment After Final in response to the Office Action dated December 6, 2006, and
made final (16 pages)
Return receipt postcard

STATUS

2. Applicant
☐ claims small entity status.
☒ is other than a small entity.

CERTIFICATE OF MAILING BY EXPRESS MAIL TO
THE COMMISSIONER FOR PATENTS

Express Mail No. EV 918278911 US
Date: January 31, 2007

I hereby certify that the documents listed above are being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 C.F.R. §1.10 on the date indicated above in an envelope addressed to Mail Stop: AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.


Robert B. Reeser, III, Reg. No. 45,548

OCT 11 2007

EXTENSION OF TERM

COPY

3. The proceedings herein are for a patent application and the provisions of 37 C.F.R. 1.136 apply.

(complete (a) or (b), as applicable)

- (a) _____ Applicant petitions for an extension of time under 37 C.F.R. 1.136
(Fees: 37 C.F.R. 1.17(a)-(d) for the total number of months checked below:)

| Extension for response within: | Other than small entity Fee | Small entity Fee (if applicable) |
|-----------------------------------|--------------------------------|-------------------------------------|
| _____ first month | \$ 120.00 | \$ 60.00 |
| _____ second month | \$ 450.00 | \$ 225.00 |
| _____ third month | \$ 1,020.00 | \$ 510.00 |
| _____ fourth month | \$1,590.00 | \$ 795.00 |
| _____ fifth month | \$2,160.00 | \$1,080.00 |

Fee: \$ _____

If an additional extension of time is required, please consider this a petition therefor.

(Check and complete the next item, if applicable)

_____ An extension of _____ months has already been secured. The fee paid therefor \$_____ is deducted from the total fee due for the total months of extension now requested.

Extension fee due with this request \$_____

OR

- (b) X Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition for extension of time.

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FEE FOR CLAIMS

COPY

4. The fee for claims (37 C.F.R. 1.16(b)-(d)) has been calculated as shown below:

| (Col. 1) | | (Col. 2) | (Col. 3) | SMALL ENTITY | | OTHER THAN SMALL ENTITY |
|---|--|---------------------------------------|------------------|----------------------------|----|----------------------------|
| CLAIMS REMAINING AFTER AMENDMENT | | HIGHEST NO. PREVIOUSLY PAID FOR | PRESENT EXTRA | ADDITIONAL RATE FEE | OR | ADDITIONAL RATE FEE |
| TOTAL INDEP. | | MINUS | = | x \$25.00 = \$ | | x \$50.00 = \$ |
| | | MINUS | = | x \$100.00 = \$ | | x \$200.00 = \$ |
| FIRST PRESENTATION OF MULTIPLE DEP. CLAIM | | | | + \$180.00 = \$ | | + \$360.00 = \$ |
| | | | | TOTAL ADDITIONAL FEE \$ | OR | TOTAL ADDITIONAL FEE \$ |

- (a) ☒ No additional fee for Claims is required

OR

- (b) ☐ Total additional fee for claims required \$ _____

FEE PAYMENT

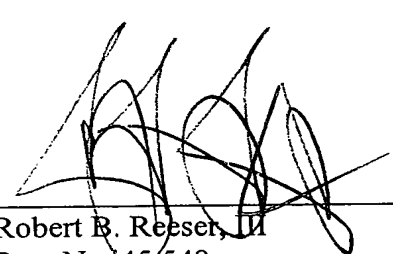
5. Attached is a check in the sum of \$ _____
- ☐ Charge Deposit Account No. 01-2384 the sum of \$ _____.
A duplicate of this transmittal is attached.

FEE DEFICIENCY

6. ☒ If any additional extension and/or fee is required, charge Deposit Account No. 01-2384.

AND/OR

- ☒ If any additional fee for claims is required, charge Deposit Account No. 01-2384.
7. ☐ Other:


 Robert B. Reeser, III
 Reg. No. 45,548
 ARMSTRONG TEASDALE LLP
 One Metropolitan Square, Suite 2600
 St. Louis, MO 63102
 314-621-5070

OCT 11 2007

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Peter R. Hull, et al.

:

Art Unit: 3746

Serial No.: 10/828,663

:

Examiner: Kim, Tae Jun

Filed: April 21, 2004

:

For: GAS TURBINE HEAT EXCHANGER
ASSEMBLY AND METHOD FOR
FABRICATING SAME

:

:

:

AMENDMENT AFTER FINAL

Mail Stop: AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the final Office Action dated December 6, 2006, and made final, please
amend the above-identified application as follows:

IN THE CLAIMS:

1-7. (canceled)

8. (currently amended) A heat exchanger assembly for a gas turbine engine, said heat exchanger assembly comprising:

an annular manifold comprising an inlet manifold coupled in flow communication with a compressor and an outlet manifold coupled in flow communication with a combustor, said annular manifold substantially concentrically aligned with respect to an axis of rotation of the gas turbine engine, and said inlet manifold and said outlet manifold each including an outermost surface having a substantially equal radial distance with respect to the axis of rotation of the gas turbine engine; and

an annular heat exchanger coupled in flow communication to the compressor via said annular manifold, said heat exchanger configured to channel compressor discharge air to a said combustor, said heat exchanger assembly coupled to said gas turbine engine such that said heat exchanger is substantially concentrically aligned with respect to the axis of rotation of the gas turbine engine, said heat exchanger comprising a plurality of heat exchanger elements, wherein each heat exchanger element is aligned substantially perpendicular to a direction of exhaust flow discharged substantially axially from the gas turbine engine.

9. (previously presented) A heat exchanger assembly in accordance with Claim 8 further comprising an outer casing coupled to said heat exchanger and to a gas turbine rear frame such that said annular heat exchanger is substantially concentrically aligned with respect to the axis of rotation of the gas turbine engine.

10. (previously presented) A heat exchanger assembly in accordance with Claim 8 further comprising a plug nozzle fixedly secured to a gas turbine rear frame to facilitate controlling an amount of exhaust flow channeled through said heat exchanger.

11. (withdrawn) A heat exchanger assembly in accordance with Claim 8 further comprising a plug nozzle coupled to a gas turbine rear frame, said plug nozzle moveable with respect to said heat exchanger to facilitate channeling exhaust flow through said heat exchanger.

12. (withdrawn) A heat exchanger assembly in accordance with Claim 11 further comprising a translation apparatus coupled to said plug nozzle to facilitate regulating the quantity of exhaust flow through said heat exchanger.

13. (withdrawn) A heat exchanger assembly in accordance with Claim 12 wherein said translation apparatus comprises at least one of a mechanical device, a hydraulic device, and a pneumatic device.

14. (withdrawn) A heat exchanger assembly in accordance with Claim 12 further comprising a drive mechanism coupled to said translation device, said drive mechanism configured to selectively translate said plug nozzle to facilitate regulating the quantity of exhaust flow through said heat exchanger.

15. (previously presented) A heat exchanger assembly in accordance with Claim 8 wherein said heat exchanger comprises a plurality of heat exchanger elements, each said heat exchanger element comprising an inlet side in flow communication with said inlet manifold and an outlet side in flow communication with said outlet manifold.

16. (original) A heat exchanger assembly in accordance with Claim 15 wherein said inlet manifold comprises a cross-sectional area that is inversely proportional to a cross-sectional area of said outlet manifold.

17. (currently amended) A gas turbine engine comprising:

a compressor;

a combustor downstream from said compressor;

a turbine coupled in flow communication with said combustor; and

a heat exchanger assembly comprising:

an annular manifold comprising an inlet manifold coupled in flow communication with said compressor and an outlet manifold coupled in flow communication with said combustor, said annular manifold concentrically aligned with respect to an axis of rotation of the gas turbine engine, and said inlet manifold and said outlet manifold each

including an outermost surface having a substantially equal radial distance with respect to the axis of rotation of the gas turbine engine; and

an annular heat exchanger comprising a plurality of heat exchanger elements, said heat exchanger coupled in flow communication to said compressor via said annular manifold, said heat exchanger configured to channel compressor discharge air to said combustor, said heat exchanger assembly coupled to said gas turbine engine such that said annular heat exchanger is substantially concentrically aligned with respect to the axis of rotation of the gas turbine engine, ~~said plurality of heat exchanger elements aligned in an approximate sinusoidal arrangement extending around an inner periphery of an outer casing~~ wherein each heat exchanger element is aligned substantially perpendicular to a direction of exhaust flow discharged substantially axially from the gas turbine engine.

18. (previously presented) A gas turbine engine in accordance with Claim 17 wherein said heat exchanger assembly further comprises a plug nozzle fixedly secured to a gas turbine rear frame to facilitate controlling an amount of exhaust flow channeled through said heat exchanger.

19. (withdrawn) A gas turbine engine in accordance with Claim 17 wherein said heat exchanger assembly further comprises a plug nozzle coupled to a gas turbine rear frame, said plug nozzle moveable with respect to said heat exchanger to facilitate channeling exhaust flow through said heat exchanger.

20. (withdrawn) A gas turbine engine in accordance with Claim 19 wherein said heat exchanger assembly further comprises:

a translation apparatus coupled to said plug nozzle to facilitate regulating the quantity of exhaust flow through said heat exchanger; and

a drive mechanism coupled to said translation device, said drive mechanism configured to selectively translate said plug nozzle to facilitate regulating the quantity of exhaust flow through said heat exchanger.

21. (previously presented) A heat exchanger assembly in accordance with Claim 8 wherein said heat exchanger elements further comprise a plurality of heating fins aligned substantially parallel to a direction of exhaust flow discharged from the gas turbine engine.

Remarks

The Office Action mailed December 6, 2006, and made final, has been carefully reviewed and the following remarks have been made in consequence thereof.

Claims 8-22 are pending in this application. Claims 8-10, 15-18 and 21 stand rejected. Claims 11-14, 19 and 20 have been withdrawn. Claim 22 is newly added. No additional fee is due for newly added Claim 22. No new matter has been added.

The rejection of Claims 8-10 and 15-18 under 35 U.S.C. § 102(b) as being anticipated by Dyste et al. (U.S. Patent 3,222,864) (hereinafter referred to as "Dyste") is respectfully traversed.

Dyste describes a gas turbine engine-recuperator combination (10) including a gas turbine engine (12) and a recuperator (14) having an annular heat exchanger (56). The annular heat exchanger includes an aggregate of pipes (60), wherein each pipe extends parallel to an axis of rotation of engine (12). As such, during operation, exhaust from engine (10) is discharged substantially parallel to each pipe. Accordingly, Dyste does not describe nor suggest a heat exchanger, wherein each heat exchanger element is aligned substantially perpendicular to a direction of exhaust flow discharged substantially axially from a gas turbine engine. Rather, Dyste describes a heat exchanger, wherein each heat exchanger element is aligned substantially *parallel* to a direction of exhaust flow discharged substantially axially from a gas turbine engine.

Claim 8 recites a heat exchanger assembly for a gas turbine engine, wherein the heat exchanger assembly comprises "an annular manifold comprising an inlet manifold coupled in flow communication with a compressor and an outlet manifold coupled in flow communication with a combustor, said annular manifold substantially concentrically aligned with respect to an axis of rotation of the gas turbine engine, and said inlet manifold and said outlet manifold each including an outermost surface having a substantially equal radial distance with respect to the axis of rotation of the gas turbine engine . . . an annular heat exchanger coupled in flow communication to a-the compressor via said annular manifold, said heat exchanger configured to channel compressor discharge air to said combustor, said heat exchanger assembly coupled to said gas turbine engine such that said heat exchanger is substantially concentrically aligned with respect to the axis of rotation of the gas turbine

engine, said heat exchanger comprising a plurality of heat exchanger elements, wherein each heat exchanger element is aligned substantially perpendicular to a direction of exhaust flow discharged substantially axially from the gas turbine engine.”

Dyste does not describe nor suggest a heat exchanger assembly for a gas turbine engine as is recited in Claim 8. Specifically, Dyste does not describe or suggest a heat exchanger assembly including a plurality of heat exchanger elements, wherein each heat exchanger element is aligned substantially perpendicular to a direction of exhaust flow discharged substantially axially from a gas turbine engine. Rather, in contrast with the present invention, Dyste describes a heat exchanger, wherein each heat exchanger element is aligned substantially *parallel* to a direction of exhaust flow discharged substantially axially from a gas turbine engine. Accordingly, for at least the reasons set forth above, Claim 8 is submitted to be patentable over Dyste.

Claims 9-10, 15, and 16 depend from Claim 8. When the recitations of Claims 9-10, 15, and 16 are considered in combination with the recitations of Claim 8, Applicants submit that dependent Claims 9-10, 15, and 16 likewise are patentable over Dyste.

Claim 17 recites a gas turbine engine comprising “a compressor . . . a combustor downstream from said compressor . . . a turbine coupled in flow communication with said combustor . . . a heat exchanger assembly comprising . . . an annular manifold comprising an inlet manifold coupled in flow communication with said compressor and an outlet manifold coupled in flow communication with said combustor, said annular manifold concentrically aligned with respect to an axis of rotation of the gas turbine engine, and said inlet manifold and said outlet manifold each including an outermost surface having a substantially equal radial distance with respect to the axis of rotation of the gas turbine engine . . . an annular heat exchanger comprising a plurality of heat exchanger elements, said heat exchanger coupled in flow communication to said compressor via said annular manifold, said heat exchanger configured to channel compressor discharge air to said combustor, said heat exchanger assembly coupled to said gas turbine engine such that said annular heat exchanger is substantially concentrically aligned with respect to the axis of rotation of the gas turbine engine, wherein each heat exchanger element is aligned substantially perpendicular to a direction of exhaust flow discharged substantially axially from the gas turbine engine.”

Dyste does not describe nor suggest a gas turbine engine having a heat exchanger assembly as is recited in Claim 17. Specifically, Dyste does not describe or suggest a heat exchanger assembly including a plurality of heat exchanger elements, wherein each heat exchanger element is aligned substantially perpendicular to a direction of exhaust flow discharged substantially axially from a gas turbine engine. Rather, in contrast with the present invention, Dyste describes a heat exchanger, wherein each heat exchanger element is aligned substantially *parallel* to a direction of exhaust flow discharged substantially axially from a gas turbine engine. Accordingly, for at least the reasons set forth above, Claim 17 is submitted to be patentable over Dyste.

Claim 18 depends from Claim 17. When the recitations of Claim 18 are considered in combination with the recitations of Claim 17, Applicants submit that dependent Claim 18 likewise is patentable over Dyste.

For at least the reasons set forth above, Applicants respectfully request that the Section 102 rejection of Claims 8-10 and 15-18 be withdrawn.

The rejection of Claims 8-10 and 15-18 under 35 U.S.C. § 103(a) as being unpatentable over Zirin (U.S. Patent 3,201,938) in view of Beam, Jr. et al. (U.S. Patent 3,386,243) (hereinafter referred to as "Beam") or Dyste is respectfully traversed.

Dyste is described hereinabove.

Zirin describes a gas turbine powerplant (10) including an axial flow compressor (11), a combustor (12), a gas turbine engine (13), a power turbine (14) and heat exchanger members (22). Each of the heat exchanger members (22) is connected to a plurality of conduits (27) including an outer annular header (23), an inner annular header (24) and conduits (25). Notably, during operation, exhaust from engine (13) is discharged radially outward therefrom. Accordingly, Zirin does not describe nor suggest a heat exchanger, wherein each heat exchanger element is aligned substantially perpendicular to a direction of exhaust flow discharged substantially axially from a gas turbine engine. Rather, Zirin describes a heat exchanger, wherein each heat exchanger element is aligned substantially perpendicular to a direction of exhaust flow discharged *radially outward* from a gas turbine engine.

Beam describes a turboprop engine including a compressor (5), a diffuser (6), a combustion apparatus (7), a turbine (9) and an annular recuperator (10). During operation, air flows from the diffuser (6) to the recuperator (10) through air inlet pipes (13) that are spaced around an axis of the engine. Heated air flows back to the combustion apparatus (7) through pipes (14) distributed around the engine axis. The air inlet pipes (13) and the pipes (14) are connected to a recuperator structure (18) that defines return flow paths for compressed air entering through the air inlet pipes (13) and channeled through the pipes (14). Notably, Beam does not describe nor suggest a heat exchanger, wherein each heat exchanger element is aligned substantially perpendicular to a direction of exhaust flow discharged substantially axially from a gas turbine engine.

Claim 8 recites a heat exchanger assembly for a gas turbine engine, wherein the heat exchanger assembly comprises "an annular manifold comprising an inlet manifold coupled in flow communication with a compressor and an outlet manifold coupled in flow communication with a combustor, said annular manifold substantially concentrically aligned with respect to an axis of rotation of the gas turbine engine, and said inlet manifold and said outlet manifold each including an outermost surface having a substantially equal radial distance with respect to the axis of rotation of the gas turbine engine . . . an annular heat exchanger coupled in flow communication to a-the compressor via said annular manifold, said heat exchanger configured to channel compressor discharge air to said combustor, said heat exchanger assembly coupled to said gas turbine engine such that said heat exchanger is substantially concentrically aligned with respect to the axis of rotation of the gas turbine engine, said heat exchanger comprising a plurality of heat exchanger elements, wherein each heat exchanger element is aligned substantially perpendicular to a direction of exhaust flow discharged substantially axially from the gas turbine engine."

No combination of Zirin, Beam, and Dyste, describes nor suggests a gas turbine engine having a heat exchanger assembly as is recited in Claim 8. Specifically, no combination of Zirin, Beam, and Dyste describes nor suggests a heat exchanger assembly including a plurality of heat exchanger elements, wherein each heat exchanger element is aligned substantially perpendicular to a direction of exhaust flow discharged substantially axially from a gas turbine engine. Rather, in contrast to the present invention, Dyste describes a heat exchanger, wherein each heat exchanger element is aligned substantially *parallel* to a direction of exhaust flow discharged substantially axially from a gas turbine

engine, Zirin describes a heat exchanger, wherein each heat exchanger element is aligned substantially perpendicular to a direction of exhaust flow discharged *radially outward* from a gas turbine engine, and Beam merely describes air inlet pipes being coupled to an outer shell of an annular recuperator. Accordingly, for at least the reasons set forth above, Claim 8 is submitted to be patentable over Zirin in view of Beam or Dyste.

Claims 9-10, 15, and 16 depend from Claim 8. When the recitations of Claims 9-10, 15, and 16 are considered in combination with the recitations of Claim 8, Applicants submit that dependent Claims 9-10, 15, and 16 likewise are patentable over Zirin in view of Beam or Dyste.

Claim 17 recites a gas turbine engine comprising "a compressor . . . a combustor downstream from said compressor . . . a turbine coupled in flow communication with said combustor . . . a heat exchanger assembly comprising . . . an annular manifold comprising an inlet manifold coupled in flow communication with said compressor and an outlet manifold coupled in flow communication with said combustor, said annular manifold concentrically aligned with respect to an axis of rotation of the gas turbine engine, and said inlet manifold and said outlet manifold each including an outermost surface having a substantially equal radial distance with respect to the axis of rotation of the gas turbine engine . . . an annular heat exchanger comprising a plurality of heat exchanger elements, said heat exchanger coupled in flow communication to said compressor via said annular manifold, said heat exchanger configured to channel compressor discharge air to said combustor, said heat exchanger assembly coupled to said gas turbine engine such that said annular heat exchanger is substantially concentrically aligned with respect to the axis of rotation of the gas turbine engine, wherein each heat exchanger element is aligned substantially perpendicular to a direction of exhaust flow discharged substantially axially from the gas turbine engine."

No combination of Zirin, Beam, and Dyste describes nor suggests a gas turbine engine having a heat exchanger assembly as is recited in Claim 17. Specifically, no combination of Zirin, Beam, and Dyste describes nor suggests a heat exchanger assembly including a plurality of heat exchanger elements, wherein each heat exchanger element is aligned substantially perpendicular to a direction of exhaust flow discharged substantially axially from a gas turbine engine. Rather, in contrast with the present invention, Dyste describes a heat exchanger, wherein each heat exchanger element is aligned substantially

parallel to a direction of exhaust flow discharged substantially axially from a gas turbine engine, Zirin describes a heat exchanger, wherein each heat exchanger element is aligned substantially perpendicular to a direction of exhaust flow discharged *radially outward* from a gas turbine engine, and Beam merely describes air inlet pipes being coupled to an outer shell of an annular recuperator. Accordingly, for at least the reasons set forth above, Claim 17 is submitted to be patentable over Zirin in view of Beam or Dyste.

Claim 18 depends from Claim 17. When the recitations of Claim 18 are considered in combination with the recitations of Claim 17, Applicants submit that dependent Claim 18 likewise is patentable over Zirin in view of Beam or Dyste.

For at least the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 8-10 and 15-18 be withdrawn.

The rejection of Claims 8-10, and 15-18 under 35 U.S.C. § 103(a) as being unpatentable over Dyste in view of Colby (U.S. Patent 2,969,642) is respectfully traversed.

Dyste is described hereinabove.

Colby describes a radiator matrix design including stator vanes that are configured to straighten a flow of swirling air discharged from a compressor. Accordingly, the stator vanes provide a substantially axial flow of air as it passes through a radiator. Notably, Colby does not describe or suggest a heat exchanger, wherein each heat exchanger element is aligned substantially perpendicular to a direction of exhaust flow discharged substantially axially from a gas turbine engine.

Claim 8 recites a heat exchanger assembly for a gas turbine engine, wherein the heat exchanger assembly comprises "an annular manifold comprising an inlet manifold coupled in flow communication with a compressor and an outlet manifold coupled in flow communication with a combustor, said annular manifold substantially concentrically aligned with respect to an axis of rotation of the gas turbine engine, and said inlet manifold and said outlet manifold each including an outermost surface having a substantially equal radial distance with respect to the axis of rotation of the gas turbine engine . . . an annular heat exchanger coupled in flow communication to the compressor via said annular manifold, said heat exchanger configured to channel compressor discharge air to said combustor, said heat exchanger assembly coupled to said gas turbine engine such that said heat exchanger is

substantially concentrically aligned with respect to the axis of rotation of the gas turbine engine, said heat exchanger comprising a plurality of heat exchanger elements, wherein each heat exchanger element is aligned substantially perpendicular to a direction of exhaust flow discharged substantially axially from the gas turbine engine.”

Neither Dyste nor Colby describe nor suggest a gas turbine engine having a heat exchanger assembly as is recited in Claim 8. Specifically, neither Dyste nor Colby describe or suggest a heat exchanger assembly including a plurality of heat exchanger elements, wherein each heat exchanger element is aligned substantially perpendicular to a direction of exhaust flow discharged substantially axially from a gas turbine engine. Rather, in contrast with the present invention, Dyste describes a heat exchanger, wherein each heat exchanger element is aligned substantially *parallel* to a direction of exhaust flow discharged substantially axially from a gas turbine engine, and Colby merely describes a method of straightening swirling air in a radiator. Accordingly, for at least the reasons set forth above, Claim 8 is submitted to be patentable over Dyste in view of Colby.

Claims 9-10, 15, and 16 depend from Claim 8. When the recitations of Claims 9-10, 15, and 16 are considered in combination with the recitations of Claim 8, Applicants submit that dependent Claims 9-10, 15, and 16 likewise are patentable over Dyste in view of Colby.

Claim 17 recites a gas turbine engine comprising “a compressor . . . a combustor downstream from said compressor . . . a turbine coupled in flow communication with said combustor . . . a heat exchanger assembly comprising . . . an annular manifold comprising an inlet manifold coupled in flow communication with said compressor and an outlet manifold coupled in flow communication with said combustor, said annular manifold concentrically aligned with respect to an axis of rotation of the gas turbine engine, and said inlet manifold and said outlet manifold each including an outermost surface having a substantially equal radial distance with respect to the axis of rotation of the gas turbine engine . . . an annular heat exchanger comprising a plurality of heat exchanger elements, said heat exchanger coupled in flow communication to said compressor via said annular manifold, said heat exchanger configured to channel compressor discharge air to said combustor, said heat exchanger assembly coupled to said gas turbine engine such that said annular heat exchanger is substantially concentrically aligned with respect to the axis of rotation of the gas turbine

engine, wherein each heat exchanger element is aligned substantially perpendicular to a direction of exhaust flow discharged substantially axially from the gas turbine engine."

Neither Dyste nor Colby describe or suggest a gas turbine engine having a heat exchanger assembly as is recited in Claim 17. Specifically, neither Dyste nor Colby describe or suggest a heat exchanger assembly including a plurality of heat exchanger elements, wherein each heat exchanger element is aligned substantially perpendicular to a direction of exhaust flow discharged substantially axially from a gas turbine engine. Rather, in contrast with the present invention, Dyste describes a heat exchanger, wherein each heat exchanger element is aligned substantially *parallel* to a direction of exhaust flow discharged substantially axially from a gas turbine engine, and Colby merely describes a method of straightening swirling air in a radiator. Accordingly, for at least the reasons set forth above, Claim 17 is submitted to be patentable over Dyste in view of Colby.

Claim 18 depends from Claim 17. When the recitations of Claim 18 are considered in combination with the recitations of Claim 17, Applicants submit that dependent Claim 18 likewise is patentable over Dyste in view of Colby.

For at least the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 8-10 and 15-18 be withdrawn.

The rejection of Claims 8-10, 15-18 and 21 under 35 U.S.C. § 103(a) as being unpatentable over any of the applied art, and further in view of Cook (U.S. Patent 2,925,714) or Moskowitz et al. (U.S. Patent 3,735,588) (hereinafter referred to as "Moskowitz") is respectfully traversed.

Dyste, Zirin and Beam are described above.

Cook describes a diffuser-regenerator unit (10) including a cylindrical shell (12), vanes (14), a centrifugal compressor (16), a combustion chamber (28) and a turbine housing (38). During operation, the centrifugal compressor (16) compresses air that is channeled through passages (36), which constitute a vaned diffuser. After diffusion is completed at area (A), diffused air travels through vanes (14) of a heat exchanger, the combustion chamber (28) and an outlet aperture (60). Notably, Cook does not describe nor suggest a heat exchanger, wherein each heat exchanger element is aligned substantially perpendicular to a direction of exhaust flow discharged substantially axially from a gas turbine engine.

Moskowitz describes a turbine engine (11) including an air compressor (12), an annular forward heat exchanger (13) and a combustion chamber (14). Compressed air from the air compressor (12) is delivered through the annular heat exchanger (13) to the combustion chamber (14). The air may then be directed into a plenum (18) through an aft heat exchanger (19) and subsequently discharged through an exhaust section (21). Notably, Moskowitz does not describe nor suggest a heat exchanger, wherein each heat exchanger element is aligned substantially perpendicular to a direction of exhaust flow discharged substantially axially from a gas turbine engine.

Claim 8 recites a heat exchanger assembly for a gas turbine engine, wherein the heat exchanger assembly comprises "an annular manifold comprising an inlet manifold coupled in flow communication with a compressor and an outlet manifold coupled in flow communication with a combustor, said annular manifold substantially concentrically aligned with respect to an axis of rotation of the gas turbine engine, and said inlet manifold and said outlet manifold each including an outermost surface having a substantially equal radial distance with respect to the axis of rotation of the gas turbine engine . . . an annular heat exchanger coupled in flow communication to the compressor via said annular manifold, said heat exchanger configured to channel compressor discharge air to said combustor, said heat exchanger assembly coupled to said gas turbine engine such that said heat exchanger is substantially concentrically aligned with respect to the axis of rotation of the gas turbine engine, said heat exchanger comprising a plurality of heat exchanger elements, wherein each heat exchanger element is aligned substantially perpendicular to a direction of exhaust flow discharged substantially axially from the gas turbine engine."

No combination of Dyste, Zirin, Beam, Cook, and Moskowitz describes nor suggests a gas turbine engine having a heat exchanger assembly as is recited in Claim 8. Specifically, no combination of Dyste, Zirin, Beam, Cook, and Moskowitz describes nor suggests a heat exchanger assembly including a plurality of heat exchanger elements, wherein each heat exchanger element is aligned substantially perpendicular to a direction of exhaust flow discharged substantially axially from a gas turbine engine.

Rather, in contrast with the present invention, Rather, in contrast with the present invention, Dyste describes a heat exchanger, wherein each heat exchanger element is aligned substantially *parallel* to a direction of exhaust flow discharged substantially axially from a

gas turbine engine, Zirin describes a heat exchanger, wherein each heat exchanger element is aligned substantially perpendicular to a direction of exhaust flow discharged *radially outward* from a gas turbine engine, and Beam merely describes air inlet pipes being coupled to an outer shell of an annular recuperator. Further, in contrast with the present invention, Cook describes an outlet aperture that is coupled to a diffuser-regenerator unit at a greater radial distance than an outermost surface of an air intake neck portion, and Moskowitz merely describes a single inner annular chamber for air flow through a compressor and a combustion chamber. Accordingly, for at least the reasons set forth above, Claim 8 is submitted to be patentable over Dyste, Zirin and Beam, and further in view of Cook or Moskowitz.

Claims 9-10, 15, 16 and 21 depend from Claim 8. When the recitations of Claims 9-10, 15, 16 and 21 are considered in combination with the recitations of Claim 8, Applicants submit that dependent Claims 9-10, 15, 16 and 21 likewise are patentable over Dyste, Zirin and Beam, and further in view Cook or Moskowitz.

Claim 17 recites a gas turbine engine comprising "a compressor . . . a combustor downstream from said compressor . . . a turbine coupled in flow communication with said combustor . . . a heat exchanger assembly comprising . . . an annular manifold comprising an inlet manifold coupled in flow communication with said compressor and an outlet manifold coupled in flow communication with said combustor, said annular manifold concentrically aligned with respect to an axis of rotation of the gas turbine engine, and said inlet manifold and said outlet manifold each including an outermost surface having a substantially equal radial distance with respect to the axis of rotation of the gas turbine engine . . . an annular heat exchanger comprising a plurality of heat exchanger elements, said heat exchanger coupled in flow communication to said compressor via said annular manifold, said heat exchanger configured to channel compressor discharge air to said combustor, said heat exchanger assembly coupled to said gas turbine engine such that said annular heat exchanger is substantially concentrically aligned with respect to the axis of rotation of the gas turbine engine, wherein each heat exchanger element is aligned substantially perpendicular to a direction of exhaust flow discharged substantially axially from the gas turbine engine."

No combination of Dyste, Zirin, Beam, Cook, and Moskowitz describes nor suggests a gas turbine engine having a heat exchanger assembly as is recited in Claim 17. Specifically, no combination of Dyste, Zirin, Beam, Cook, and Moskowitz describes nor

suggests a heat exchanger assembly including a plurality of heat exchanger elements, wherein each heat exchanger element is aligned substantially perpendicular to a direction of exhaust flow discharged substantially axially from a gas turbine engine.

Rather, in contrast with the present invention, Rather, in contrast with the present invention, Dyste describes a heat exchanger, wherein each heat exchanger element is aligned substantially *parallel* to a direction of exhaust flow discharged substantially axially from a gas turbine engine, Zirin describes a heat exchanger, wherein each heat exchanger element is aligned substantially perpendicular to a direction of exhaust flow discharged *radially outward* from a gas turbine engine, and Beam merely describes air inlet pipes being coupled to an outer shell of an annular recuperator. Further, in contrast with the present invention, Cook describes an outlet aperture that is coupled to a diffuser-regenerator unit at a greater radial distance than an outermost surface of an air intake neck portion, and Moskowitz merely describes a single inner annular chamber for air flow through a compressor and a combustion chamber. Accordingly, for at least the reasons set forth above, Claim 17 is submitted to be patentable over Dyste, Zirin and Beam, and further in view of Cook or Moskowitz.

Claim 18 depends from Claim 17. When the recitations of Claim 18 are considered in combination with the recitations of Claim 17, Applicants submit that dependent Claim 18 likewise is patentable over Dyste, Zirin and Beam, and further in view Cook or Moskowitz.

For at least the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 8-10, 15-18 and 21 be withdrawn.

Newly added Claim 22 depends from Claim 8, which is submitted to be patentable over the cited prior art. When the recitations of Claim 22 are considered in combination with the recitations of Claim 8, Applicants submit that dependent Claim 22 likewise is patentable over the cited prior art.

Moreover, newly added Claim 22 recites a heat exchanger assembly in accordance with Claim 8 further comprising "a plug nozzle fixedly secured to a gas turbine rear frame, said heat exchanger elements extending radially outward from said plug nozzle." Applicants respectfully submit that none of the cited prior art describes or suggests a plug nozzle fixedly secured to a gas turbine rear frame, and heat exchanger elements that extend radially outward

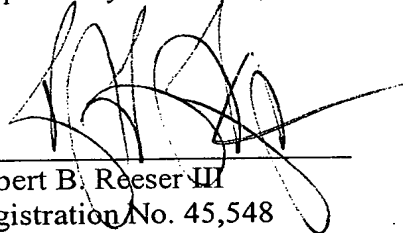
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from the plug nozzle, as is recited in Claim 22. Accordingly, for at least the reasons cited above, Applicants submit that dependent Claim 22 is patentable over the cited prior art.

In view of the foregoing amendments and remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Respectfully submitted,



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